## *Water Heating: Central System Standard Design for Multifamily Buildings*

### Description

One of the loopholes identified in the existing water heating methodology relates to multifamily buildings. The baseline water heating budget for all building types is one storage water heater per dwelling unit. Because of the large amount of standby loss associated with each individual water heater, a substantial energy credit can be obtained by installing central water heating systems. This credit can be traded-off against envelope and HVAC equipment options, resulting in a below-standard building design that, unfortunately, has excellent persistence. To close this loophole, the proposed measure establishes a central system as the standard design for multifamily buildings that install central system water heating.

### Benefits

In addition to closing a major loophole, this measure assures that building envelope designs will not depart substantially from cost-effective prescriptive standards levels, which will likely lead to major energy savings and peak demand reductions in these buildings.

### Environmental Impact

The change will reduce energy use, thereby decreasing emissions from electric power plants and natural gas heating appliances.

### Type of Change

This change would alter prescriptive requirements in terms of modifying the baseline in multifamily buildings. The *Standards,* ACM Manual, and compliance forms would all be affected by these changes.

### Measure Availability and Cost

In those cases where multifamily builders took advantage of the loophole, this measure will increase construction cost by an unknown (but cost-effective) amount. This measure has no availability issues.

### Useful Life, Persistence and Maintenance

There are no issues related to this topic.

### Performance Verification

Performance verification is not required.

### Cost Effectiveness

Multifamily buildings with central water heating systems will be required to install measures that have previously been shown to be cost-effective.

### Analysis Tools

The tools used to develop current compliance methods (spreadsheet calculations and the HWSIM distribution loss model), and perhaps LBNL's WHAM model, will be used. Multifamily distribution loss calculations should be revisited as part of this work. Enhancements introduced as part of other water heating methods would be applied to this measure when appropriate.

### Relationship to Other Measures

The closing of the multifamily central water heating loophole will affect other measures to be implemented in achieving compliance. Other residential buildings will not be significantly affected.

### Bibliography and Other Research

The following data is available and will be reviewed in the course of this work:

Davis Energy Group. *California Residential Water Heating Standards – Volumes I – III, 1991*. These volumes represent the technical basis for the existing water heating standards.
USDOE Technical support document on water heating, 2000.
LBL-37805. *Modeling Patterns of Hot Water Use in Households*, November 1996. Includes information on use patterns and description of the WHAM model.
TDV studies completed for PG&E.
Water heating load profile data from various sources, including PG&E.
Experts to be contacted include:
Jim Lutz, LBNL.
Frank Stanonik, GAMA.